



Packed Bed Reactor Experiment

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Objective:

- ◆ Develop fundamental understanding of gas-liquid flow through porous media in a microgravity environment.
- ◆ Outcome will be the development of design and operational guidelines for Packed Bed Reactors in microgravity.

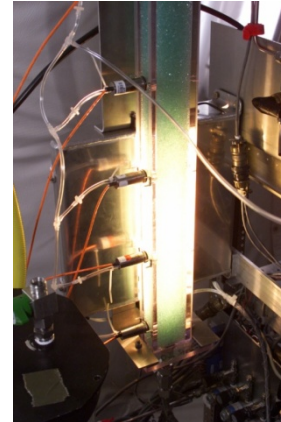
Relevance/Impact:

- ◆ Advantages of porous media components include higher throughputs, compact design, operational flexibility and minimal power consumption – applies directly to packed bed reactors.
- ◆ Porous media are critical components in life support systems; thermal control devices; fuel cells; and biological and chemical reactors.

Development Approach:

- ◆ Completed extensive (but time-limited) low-G aircraft tests.
- ◆ Engineering model hardware and Proto-flight unit.
- ◆ Video and data down-linked to the ground for evaluation.
- ◆ Develop on-orbit replaceable test section to extend experiment capabilities. Enables flexibility for future development of porous media components/devices.

Glenn Research Center



Packed Bed test in low-g Aircraft



Volatile Reactor Assembly (VRA) on STS 89

ISS Resource Requirements

| | |
|---|-------------------------------|
| Accommodation (carrier) | Microgravity Science Glovebox |
| Upmass (kg) (w/o packing factor) | 75 |
| Volume (m³) (w/o packing factor) | 0.150 |
| Peak Power (kw) | 0.100 |
| Crew Time (hrs) (installation/operations) | 25 hours |
| Autonomous Ops (hrs) | 200 hours |
| Launch/Increment | HTV/ATV/SPACEX/Inc 32-34 |

Project Life Cycle Schedule

| Milestones | MCR | SRR | PDR | CDR | VRR | Flt Safety | FHA | Launch | Ops | Return | Final Report |
|-------------------------|---------|---------|--------|---------|-----|------------|--------|--------|------------|-----------|--------------|
| Actual/ Baseline | 10/2010 | 10/2010 | 4/2011 | 12/2011 | N/A | 3/2013 | 6/2013 | 9/2013 | Inc. 32-34 | OPS + 4 m | Return +12m |